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WO 88/00487 A1 US 4703444 A

(58) Field of search

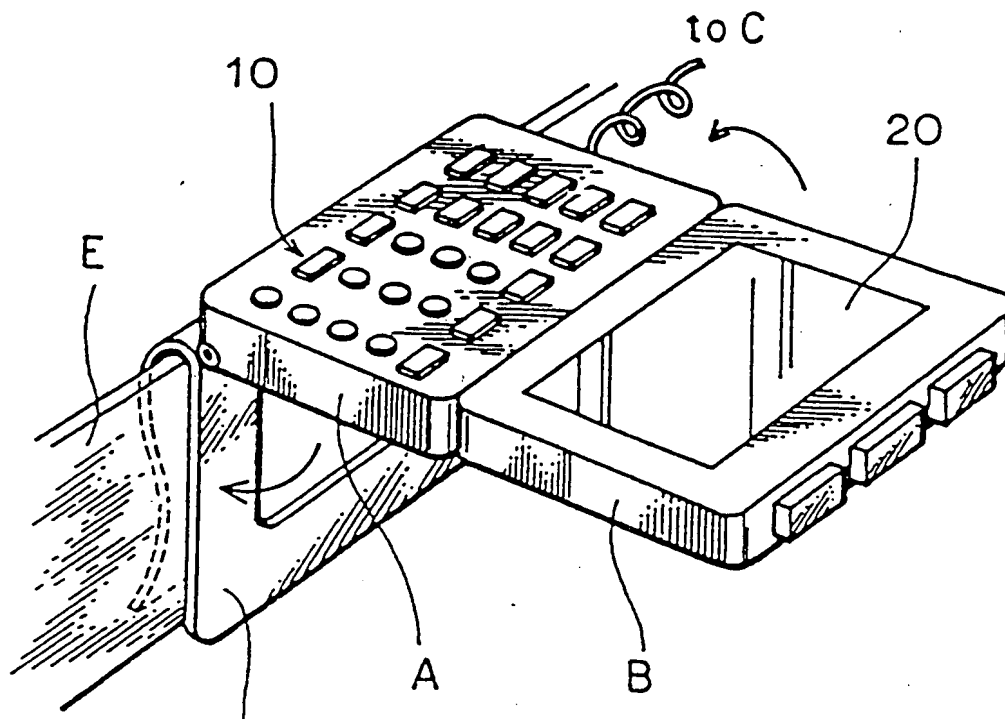
UK CL (Edition K) G4A ADT AUX, H4D DAB DPBC  
INT CL<sup>6</sup> A63B, G06F  
On-line database : W.P.I.

(54) Golfing data recorder

(57) Data on golf play is recorded by apparatus carried by a player and comprised of an input unit A, B to be operated by the player at each place where a stroke is played, a global-positioning-satellite (GPS) receiver unit, and a unit for measuring the locations of the apparatus by means of the GPS receiver in response to operation of the input unit and for storing the location, score and club selection data. The data stored may be displayed at 20, or transferred to a base computer after the game for processing and display of the successive play locations superimposed over a simulated map of a golf course. The apparatus may be mounted on the player's belt E.

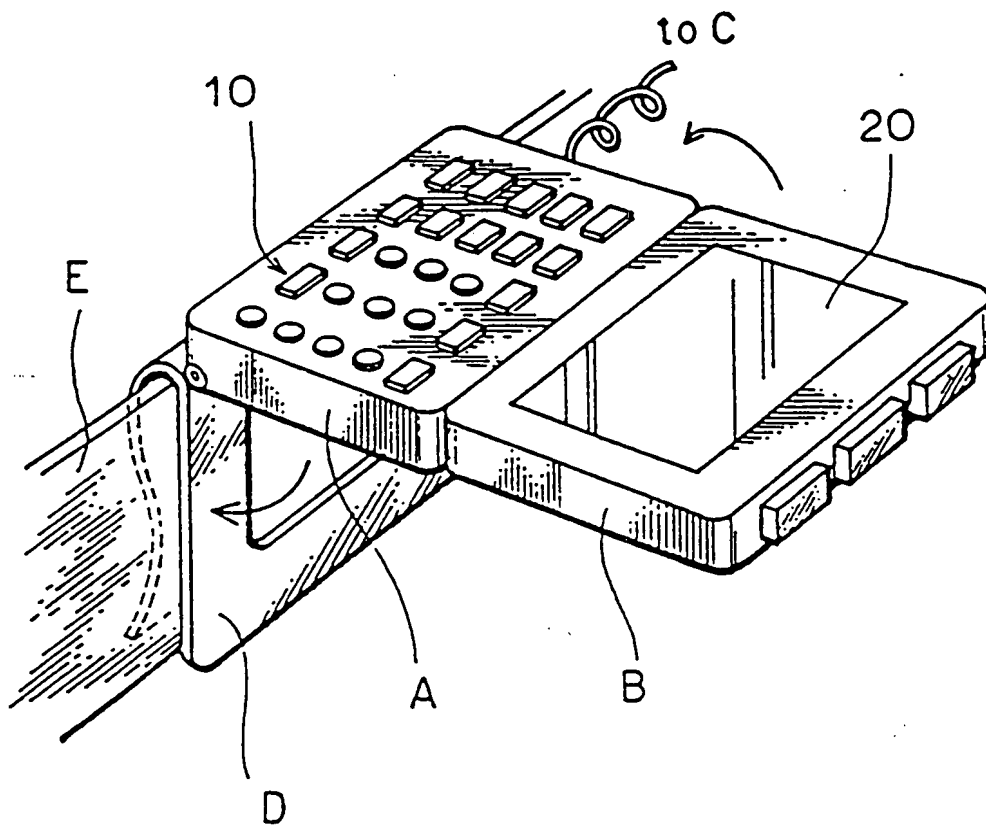
The GPS receiver may operate in conjunction with a fixed receiver at the clubhouse, to provide a differential positioning system of greater accuracy.

Fig.1



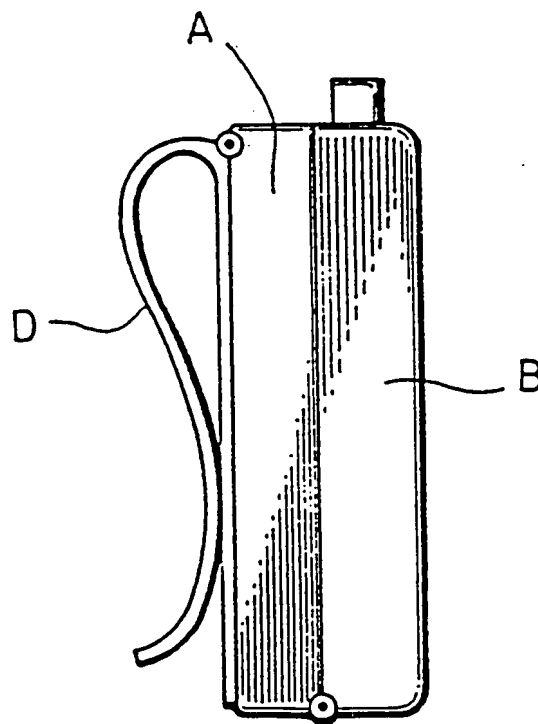
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Fig.1



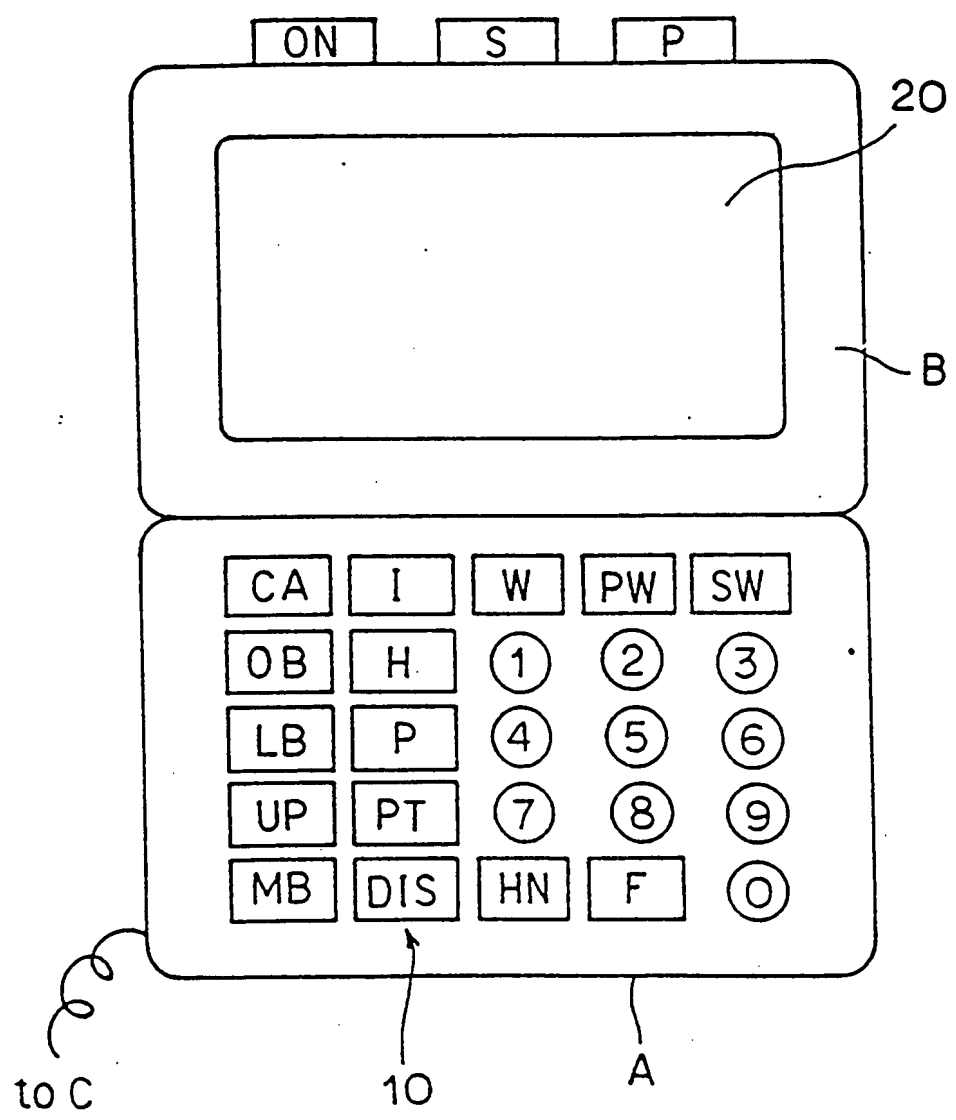
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Fig. 2



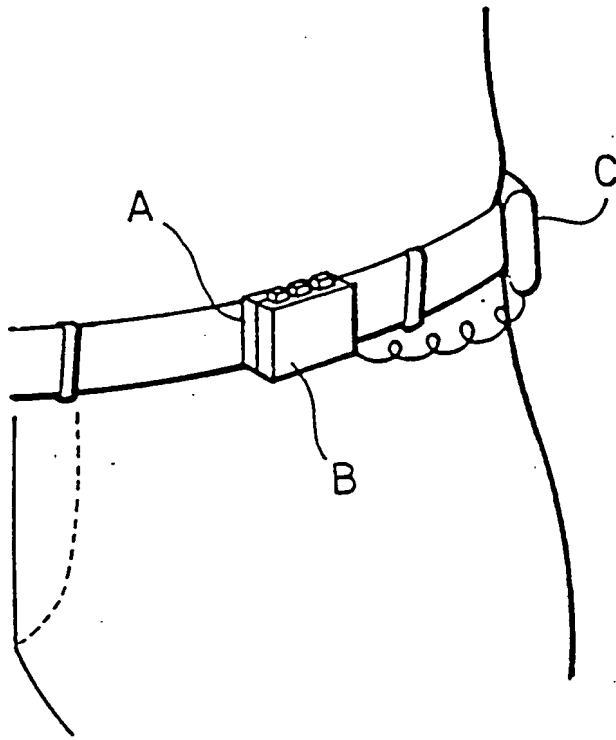
3/10

Fig. 3



4/10

Fig. 4.



5/10

Fig. 5

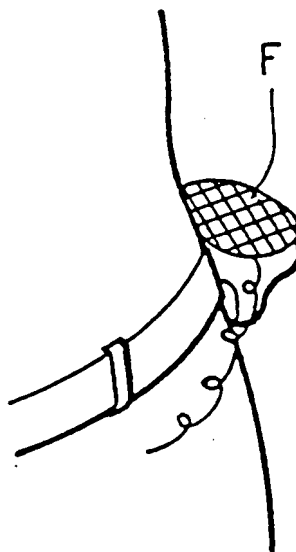


Fig. 6

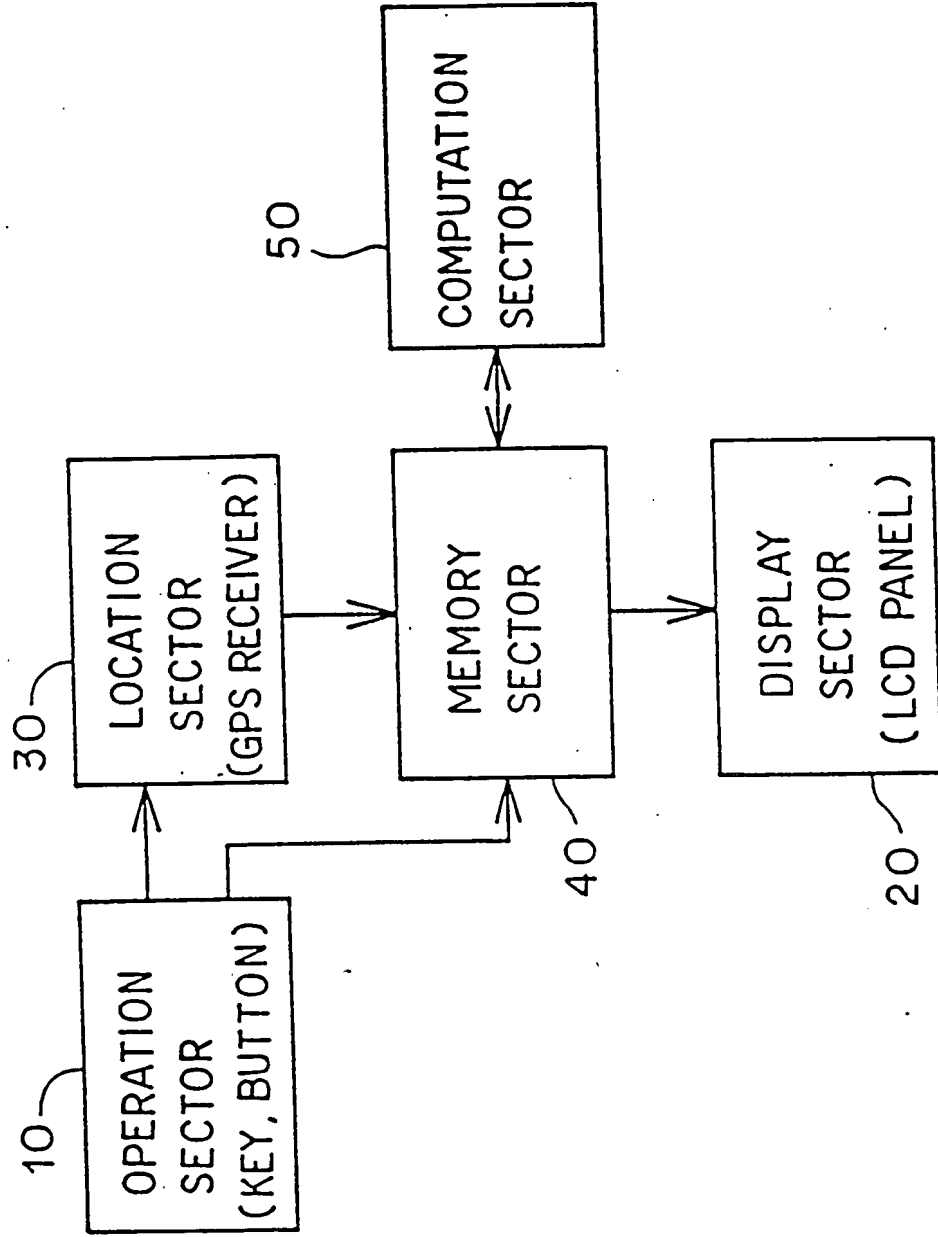
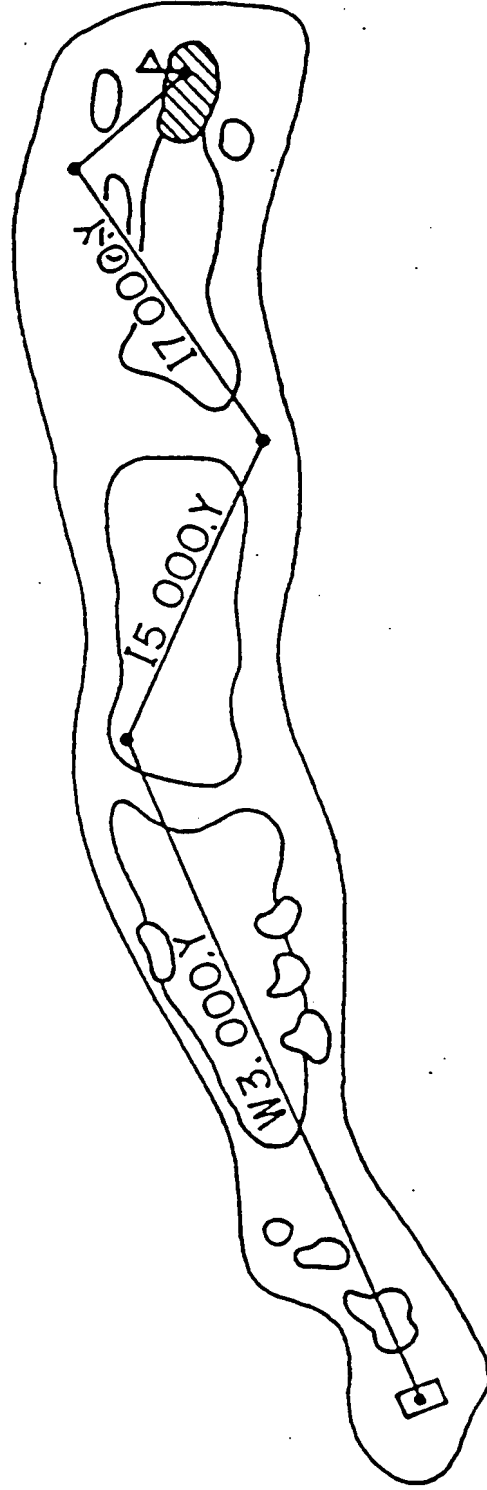


Fig. 7



XXX YARD      PAR 3

1/16



6/10

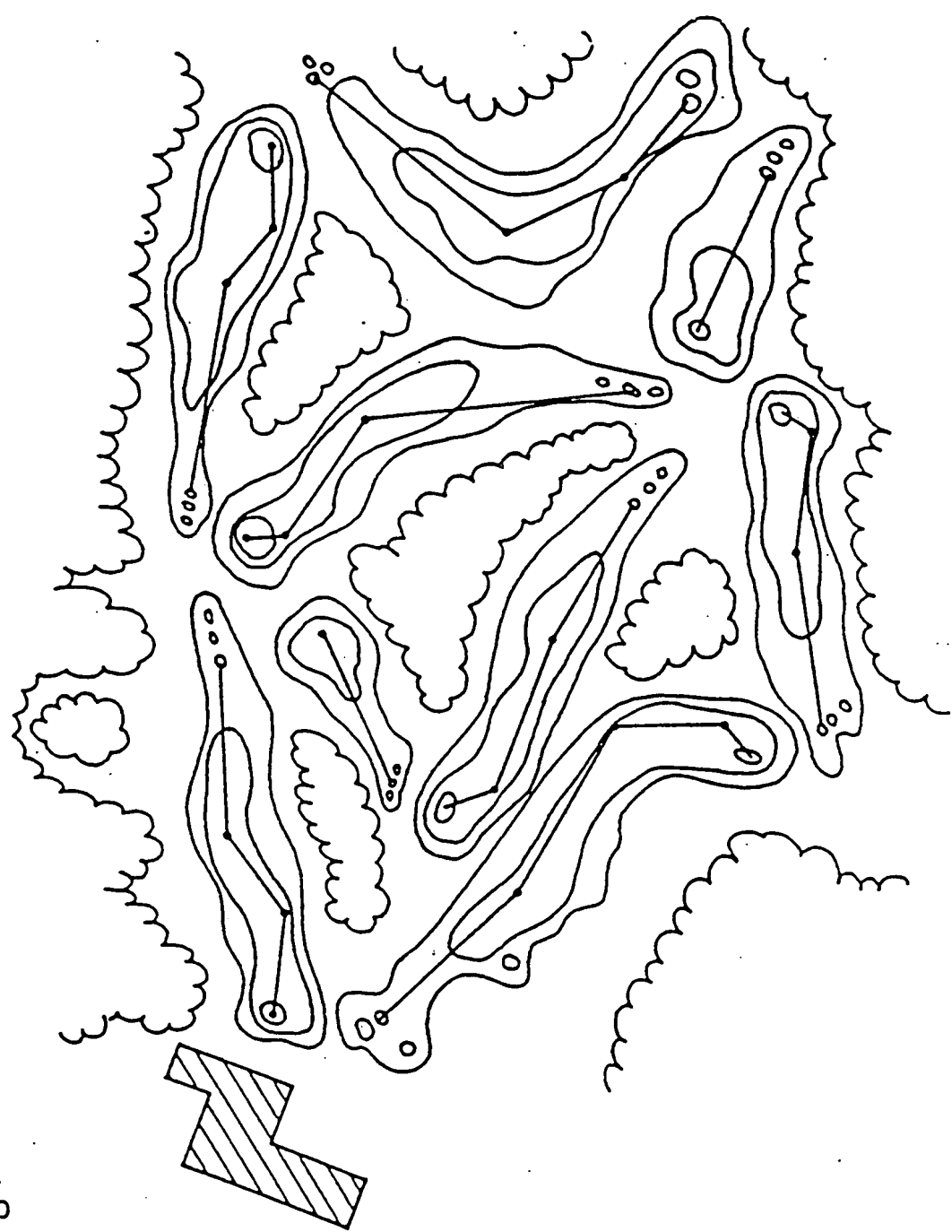
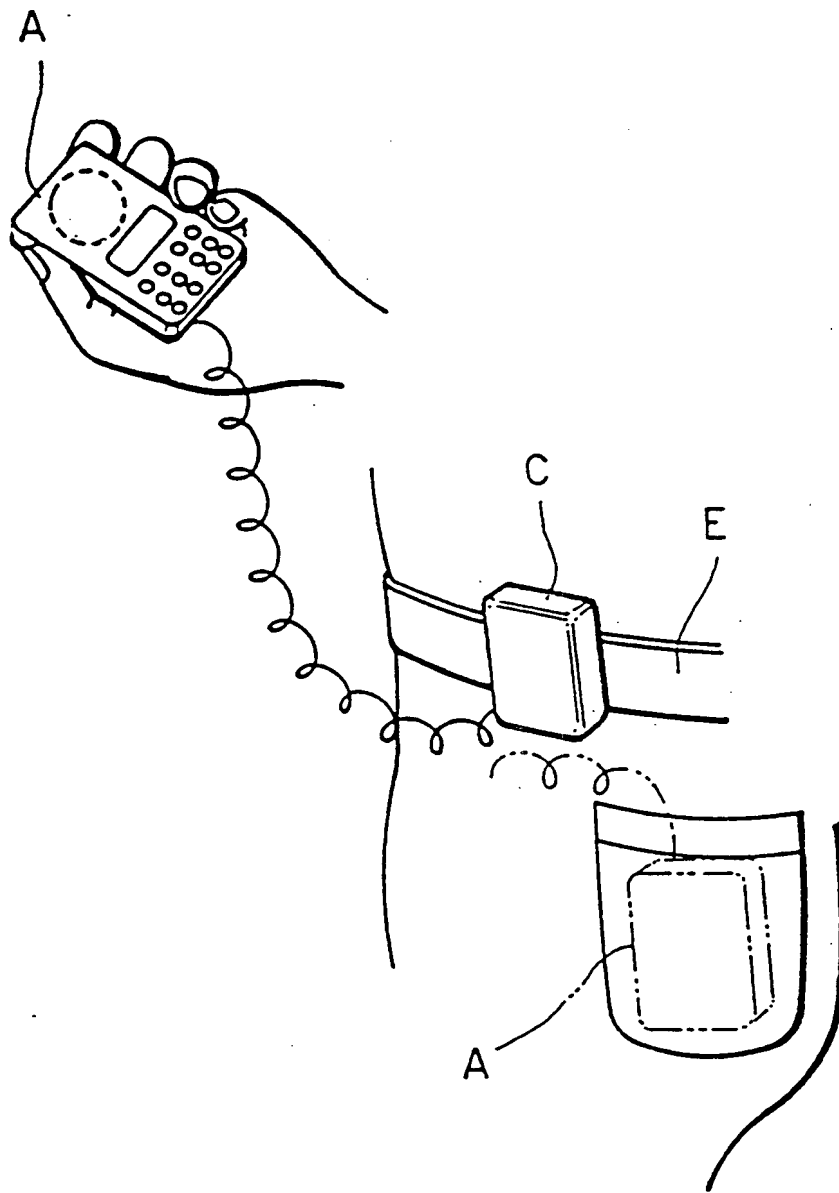


Fig. 8

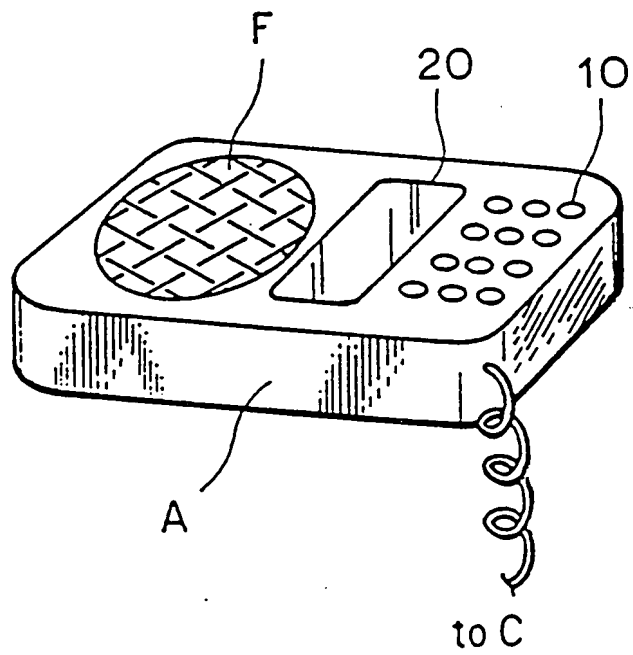
7/10

Fig. 9



10/16

Fig. 10



## SPECIFICATION

### TITLE OF THE INVENTION

APPARATUS FOR RECORDING DATA ON GOLF PLAY AND METHOD FOR DISPLAYING  
THE DATA

### FIELD OF THE INVENTION

This invention relates to an apparatus for recording data on golf play to be carried by a golf player or caddy assistant and a method for displaying the same data or information therefrom with use of a suitable data processing installation.

### DESCRIPTION OF THE RELATED ART

It has been conventionally well known that scores of a golf player are recorded into a paper card, but such scoring is nuisance, and if not assisted with other data, such a record does not make a good reference to evaluate his golfing technique, because the scores are much dependent on a golf course design; sometimes easy and sometimes hard to obtain a good result.

For the purpose of knowing a golfer's correct capability, it is customarily accepted advice to record, together with conventional scores, data on each carry distance of his shot as well as each location of his ball through the green to produce as an image a route map for his shots covering from a tee shot to a green. Further, the data on which numbered club or what identified club was used versus how long a carry distance was obtained makes

advisable information to brush up the golfing technique.

#### SUMMARY OF THE INVENTION

This invention is intended to offer a gadget or apparatus for recording data on golf play which general golfers are enabled to conveniently handle while playing and by which he or she can store his shot history including a route map for each hole.

Other aspects of this invention are to offer an apparatus for recording a carry distance of his shot and such data in relation to a club used and for facilitating score countings, and summing up thereof, further to offer a method comprising displaying a route map of his shots in a superimposed form on a simulated map of each hole course on a display screen.

An aspect of this invention features a portable apparatus for recording data on golf play to be carried by a player, which comprises: an operation sector to be operated by the player at a place of a tee shot and at other places where a shot ball is located in a golf course; a GPS receiver; a measurement sector for measuring where the apparatus is present in response to each operative act on the operation sector; a memory sector for storing data on locations measured by the measurement sector.

Therein the apparatus of the invention enables finding a carry distance of a shot based on the data which is prestored in the memory sector and the same sector will store the result, and the operation sector enables storing the data on which club is used,

thereby the relationship of the club used with a carry distance will be recorded. Further operation sector will store the scores, thereby conventional manual writing of scores into a paper card is replaced by electronic means and such data is enabled to display on the screen. The GPS receiver which defines the location sector is desirably a system for locating a place by differential navigation system.

Another aspect of this invention features a method of display which comprises: reading out data on locations stored in the memory sector of the apparatus; and joining such locations to image a route map which will be displayed in a superimposed form on a simulated map of the golf course concerned. Therein the data on carry distances and/or on the clubs used are enabled to be displayed together with the route map mentioned above.

The term "GPS" stands for the navigation system with use of Global Positioning Satellites, which system is today available any time to locate a position of a receiver. This invention features that the apparatus including the GPS receiver is carried by a golf player or caddy assistant or anybody who serves to the player while walking around the course, and he is meant to input the locations of the tee shots and of the locations where his shot ball is found in the golf course, by which inputs the basis for imaging the route map is built up.

It is to be noted here that, in the present invention, another electronic and communications installation including a GPS stationary

receiver is meant to be set up on the roof of a club house, for example, to assist the job of location by a navigation system, that is, by the differential navigation system for improvement in measurements. In addition, during a passage which a golfer would take, there are a number of points to be made the datum or standard points, for example, places for tee shots, and places for hole out. measurements at such places enable corrections, by which further improvement in the accuracy are obtained. Consequently, with use of such a simple portable GPS receiver as a moving station, it is certainly allowed to build up a route map for his ball.

Herein, the art of trajectography, a kind of differential navigation system, has a higher accuracy (plus/minus about 0.5 meter) than an ordinary differential navigation system (plus/minus about 2 meters). The use of the trajectography reduces a possible error distance and hence more advantage.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a perspective view of key portions of an embodied apparatus for recording data on golf play.

Fig. 2 shows a side view of key portions of the same apparatus.

Fig. 3 shows a plan view of key portions of the same apparatus.

Fig. 4 shows a perspective view of the apparatus in whole when carried at the waist belt of a person.

Fig. 5 shows a perspective view of another antenna when carried at the waist belt of a person.

Fig. 6 shows a block diagram to explain the internal construction of the apparatus.

Fig. 7 shows a record prepared by a method of the present invention.

Fig. 8 shows another record with the same concept as above.

Fig. 9 shows a perspective view of another example of the apparatus in whole when carried at the waist belt of a person.

Fig. 10 shows key portions of the apparatus with the same concept as in Fig. 9.

These drawings are presented to illustrate the invention, and therefore these should not be construed as limiting the invention.

#### DESCRIPTION OF THE EMBODIMENT(S)

Below, the invention will be described on embodiment(s) with reference to the drawings.

A preferred embodiment of the present invention has, as Figs. 1 to 4 show, an input panel A and a cover B which is linked by a hinge, and an apparatus body C which is connected by a wire to the input panel A. The panel A may be carried at a belt of a golfer by a hook which is provided on the back side of the panel A, and it is closed with the cover B when the panel A is out of use.

On the input panel A, there are numeral keys or ten keys and additionally, four club designation keys; I (iron clubs), W (wood clubs), PW (pitching club), SW (sand wedge), and seven other data input keys each to designate; OB (out of bound), LB (lost ball), UP



(unplayable), H (hazard), P (penalty), PT (puttings), MB (membership number), DIS (display of the record), HN (hole number), F (finish), C (cancel). These define input means 10 together with three other keys which will be noted later.

On the cover B provided are a liquid crystal display (LCD) panel 20 as a display means, and three keys as noted above to input which number of tee start-hole in (ON), shot (S) to denote how many shots, penalty (P) to denote how many penalty.

The apparatus body C connected to the input panel A contains a GPS receiver, micro-computer, IC memory, and antenna. The GPS receiver is of the differential navigation system to perform locations. The antenna is of helical type, but in the case of microstrip type, the antenna F may be of external equipment type as Fig. 5 shows.

The differential navigation system means a system which includes another stationary receiver station in addition to an outstanding moving receiver station. Therein, a stationary station and a moving station or portable receiver will receive waves from the same satellites and in the meantime, the stationary receiver will inevitably produce some errors, but the stationary receiver error can be determined and by cancelation or correction of such error from the moving receiver data in deciding locations of the moving receiver, the accuracy is improved. Therein, the stationary station as noted above is desirably the type of having an equal or a higher accuracy than the moving one and is desirably set up, for example, on the top of the club house, and it is desirably operated to

receive location data during the time covering the golf play and to store data on the stationary one, which will make the background data. And after finished the play, with use of the data stored in the stationary one through treatment of software, errors found at the stationary are canceled or corrected from the data measured by the moving one to the most accurate data. In the post treatment as noted above, the data that were measured at known points, for example, places of tee shots, places of green holes, helps to further correction.

The component units contained in the apparatus body C; GPS receiver, microcomputer, and IC memory, provides functionally the system of location sector 30, memory sector 40, and computation sector 50 as shown in Fig. 6. Therein, through input operations by keys or pushbuttons, various data are sent to the location sector 30 and memory sector 40. The computation sector 50 will compute with use of the data stored in the memory sector 40, of which results will be sent to the memory sector 40. And therefrom the data will be, according to call-out instructions, displayed in the LCD panel 20 as function of the display sector. Below, further details involved will be described.

A golfer who comes to a tee shot place at each hole is meant to start the inputs by pushing the key of tee start-hole in, by which the location of the tee shot is measured and the data thereof is stored. He is also meant to input the hole number. After the tee shot, he is meant to input when he comes to the location of his

ball in the golf course. Then, each time he inputs a location of his ball, data on these locations and carry distances are memorized and computed, and displayed, with shot countings. And Identity of the clubs used is meant to be input as necessary.

As noted before, the data on carry distances will be further corrected when the data is post-treated with use of the computer installation connected with the stationary receiving station installed in the club house.

After the green-on, the golfer is meant to input the shot key at the location of putting each time or to push the key of tee start-hole in and thereafter to input the number of puttings after the hole out. The input of the putting count is done by pushing a numeral key after the key of putting count. Then, GPS receivers normally available as portable type are hardly enabled of discriminating different places on a green, therefore only putting counts will persist although the shot key was pushed.

When an out of bound, lost ball or another penalty case takes place, he is meant to use appropriate keys or shot count equivalent to the penalty.

Scores input are all stored, which may be reviewed by displaying on the LCD panel 20 as desired. The information according to the inventive idea on the method aspect in this invention, that is, display of the outcome will be present after the finish of golf play as will be noted below.

After the play is finished, in the club house or at the place where

the stationary installation is set up, the data stored in the portable apparatus is sent a computer accompanying to the stationary receiver for post treating and editing of the data to convert them to further information. The data sent includes the hole numbers, route of shots, carry distances, scores, identity of clubs, penalty counts, putting counts. The computer is meant to correct the data as noted before and to prepare an image of a route map for each hole which is displayed on a screen attached to the computer as shown in Fig. 7, wherein the route of shots is superimposed on a simulated hole map and as required, carry distances and identity of the clubs are numerically displayed. Further through computer operation, a simulated bird-eye-view map covering the whole holes with the ball routes is prepared and displayed as shown in Fig. 8, wherein weather data; wind, rain, are imparted as required. Further a score table, ranking table in a competition, and correlation between a club used and wind nature may be prepared, wherein players' handicaps can be taken into account in preparation of the competition list.

The data or information thus prepared are stored in an auxiliary memory sector, which will be used for the purpose of deciding handicaps of players, average performance for a season or through a year to serve to players.

The embodiment(s) as noted above is not limitative, but illustrative. For example, design of the apparatus, layout of the

operation sector, process of treating the data may be changed to suit convenience in case. Fig. 9 shows a perspective view of another embodiment of the present invention, and Fig. 10 shows key portions of the same in enlarged view.

Referring to this embodiment, the apparatus comprises the operation panel A and the apparatus body C. The operation panel A is meant to be connected to the body C which is fastened to a belt E of a golfer and it is carried with placed in a pocket while inoperative. This operation panel A includes, in addition to the operation sector 10, the LCD display panel 20, and antenna F. This type of apparatus has more freedom with the operation panel A, easier operation, and easier to change a position and/or a direction of the antenna F when put in the receiving status. Thereby, avoidance of possible obstruction by other persons or trees nearby may be performed. Further, such modification is allowable as installing antennas singly in the operation panel A and the body C so as to receive the navigation message from the satellites by the antenna A and to use the antenna C as location measurements.

Use of the apparatus and method of the present invention permits, without making trouble in playing golf, recording of routes of golfers's balls with aid of a GPS receiver, and the records thus obtained facilitates golfers to have a chance of reviewing their level or defects and thereby to improve their technique, wherein they are entitled to know real carry distance under various conditions and correlation of clubs used to carry distances, and

they can stock such information. Further manual writing into a conventional paper card is replaced by electronic memorization of such data, which will dispense with the paper cards.

Use of the visual display produced by the present invention gives strong impression to golfers who are enabled to understand their technique so objective together with other conditions which were difficult to be taken into consideration quantitatively. Speaking from the management of a golf course, they need not use the location system by use of the GPS receiver, which lessens their initial installation cost, and they can offer better service by use of the system to customer players.

## CLAIM

What is claimed is:

1. An apparatus for recording data on golf play to be carried by a player himself, which comprises:  
an operation sector to be operated by the player at a place of tee shot and at each place where his shot ball is located;  
a GPS receiver unit;  
a measurement sector for measuring a location of the apparatus by the GPS receiver in response to each operative act on the operation sector;  
a memory sector for storing a location the data measured by the measurement sector.
2. An apparatus as claimed in claim 1, wherein the apparatus further comprises a computer sector for computing a carry distance of the ball based on the data stored in the memory sector.
3. An apparatus as claimed in claim 1, wherein the data stored in the memory sector further comprises a score played, and/or an identity of a club used.
4. An apparatus as claimed in claim 1, wherein the apparatus further comprises a display sector which displays the data stored in the memory sector.
5. An apparatus as claimed in claim 1, wherein the GPS receiver uses a location system which conforms to differential navigation system.
6. A method for displaying data on golf play, which comprises:

inputting data on golf play with use of an apparatus which is defined and comprised of;

an operation sector to be operated by the player at a place of tee shot and at each place where his shot ball is located;

a GPS receiver unit;

a measurement sector for measuring a location of the apparatus by the GPS receiver in response to each operative act on the operation sector;

a memory sector for storing a location the data measured by the measurement sector;

reading out the data on locations of a golf ball from the memory sector of the apparatus;

and connecting the ball locations to produce a route map for the ball; and

displaying said route map in superimposed manner over a simulated map of a golf course.

7. A method for displaying data on golf play as claimed in claim 6, which comprises displaying a carry distance of a hit ball computed from the location data and/or identity of a club used, together with the route map for the ball, in superimposed manner over the simulated map of the golf course.



8. Apparatus substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

9. A method of displaying data on golf play substantially as hereinbefore described with reference to the accompanying drawings.

Patents Act 1977  
Examiner's report to the Comptroller under  
Section 17 (The Search Report)

Application number

9120325.7

Relevant Technical fields

- (i) UK CI (Edition K ) G4A (ADT, AUX) ; H4D (DAB, DPBC)
- (ii) Int CI (Edition S ) A63B; G06F

Search Examiner

B G WESTERN

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES:WPI

Date of Search

13 JANUARY 1992

Documents considered relevant following a search in respect of claims

1-9

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	WO 88/00487 A1 (TRANSCONTINENTAL CART) see whole document	1-9
A	US 4703444 A (STORMS ET AL) see whole document	1-9

Category	Identity of document and relevant passages - 16 -	Relevant to claim(s)

#### Categories of documents

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